

Clinical outcomes of Ceftriaxone 1 gram vs. 2 gram daily for the treatment of gram-negative Enterobacteriaceae bloodstream infections. A Alhadad, (PharmD, SSP), C. Surio, A. Tehrani and M. Jeffres, Skaggs School of Pharmacy, University of Colorado, Denver, CO.

Within our health system empiric ceftriaxone dose for patients, outside of central nervous system (CNS) infection, is inconsistent. It is theorized that a regimen of ceftriaxone 2 g daily is more likely to achieve pharmacodynamic goals and therefore improve patient outcomes. However, increasing dose exposure of antibiotics may lead to more adverse events including Clostridium difficile infection (CDI). This study evaluates the clinical outcomes of patients with gram-negative Enterobacteriaceae bloodstream infections when treated with ceftriaxone 1 gram (g) versus 2 g daily.

## Methods

This study was conducted as a retrospective chart review of patients receiving either 1 g every 24 hours or 2 g every 24 hours of intravenous ceftriaxone for gram negative bloodstream infection. Patient data was pulled from the University of Colorado Health electronic medical record from January 1, 2018 through August 1, 2021. Patients  $\geq 18$  years of age with evidence of gram negative Enterobacteriaceae bloodstream infection, received either 1 g or 2 g of ceftriaxone for a minimum of 72 hours were included. Patients receiving both 1 g and 2 g dosing regimens were excluded. The quick Pitt score (qPitt) was used to determine the patients' level of severity using 5 domains: hypothermia, hypotension, respiratory failure, cardiac arrest and Glasgow coma score (GCS). The primary outcome was frequency of treatment failure 72 hours post initiation of ceftriaxone therapy, and secondary outcomes included 30-day mortality, 30-day infection-related readmission, and frequency of CDI within 60 days of index infection. Data was analyzed using Fischer's exact analysis using SPSS version 27.

## Results

A total of 405 patients were included in the cohort, 168 patients in the 1 g group and 237 patients in the 2 g group. Of the cohort, 68.9% were female with an average age of 65 years, and the main source of infection was pyelonephritis (84.1%). Baseline characteristic data between the 1 g and 2 g groups of height ( $p=0.02$ ), weight ( $p=0.01$ ), race ( $p<0.01$ ), and duration of therapy ( $p<0.01$ ) were statistically significant. There was no difference between groups in any other variables. Patients' qPitt scores between the 1 g versus 2 g groups were similar: 0 (46.4% vs 48.9%), 1 (35.1% vs 31.2%), 2 (12.5% vs 13.9%), 3 (5.4% vs 5.5%), 4 (0.6% vs 0.4%).

Treatment failure between 1 g versus 2 g groups was not different (16.7% versus 21.1%,  $p=0.31$ ). No significant difference was observed between the two groups for 30-day mortality (1.2% in 1 g group versus 3.4% in the 2 g group,  $p=0.21$ ), 30-day infection related readmission (4.2% in 1 g group versus 5.5% in the 2 g group,  $p=0.65$ ) or CDI (0% in 1 g group versus 0.4% in the 2 g group,  $p=1.00$ ).

## Conclusion

In this retrospective cohort analysis, the frequency of early treatment failure was not different between patients receiving 1 g versus 2 g daily of ceftriaxone. Patients with gram negative bloodstream infections secondary to pyelonephritis do not appear to need higher doses of ceftriaxone to achieve positive clinical outcomes.